

Before the
Federal Communications Commission
Office of Engineering and Technology
Laboratory Division
Washington, DC 20554

In the Matter of)	
)	
)	
Unlicensed Use of the 6 GHz Band)	ET Docket No. 18-295
)	
Expanding Flexible Use in Mid-Band Spectrum)	
Between 3.7 and 24 GHz)	GN Docket No. 17-183
)	
)	
)	

Draft Laboratory Division Publication
Title: U-NII 6 GHz devices operating in the 5.925-7.125 GHz band
Reason: Guidance for Certification 15, Subpart E
First Category: Unlicensed Service Rules and Procedures
Second Category: U-NII devices - 15.401
Publication: 987594 (D02 EMC Measurement)
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COMMENTS OF
CSI TELECOMMUNICATIONS, INC.

George Kizer
Staff Consultant
CSI Telecommunications, Inc.
6 Hamilton Landing, Suite 170
Novato, CA 94949
703.726.5656

September 25, 2020

SECTION OF INTEREST

II. MEASUREMENT PROCEDURES

I. Contention Based Protocol (pages 21 and 22)

Indoor access points, subordinate devices and client devices operating in the 5.925-7.125 GHz band (herein referred to as unlicensed devices) are required to use technologies that include a contention-based protocol to avoid co-channel interference with incumbent devices sharing the band. To ensure incumbent co-channel operations are detected in a technology-agnostic manner, unlicensed devices are required to detect co-channel radio frequency energy (energy detect) and avoid simultaneous transmission.

Unlicensed indoor low-power devices must detect co-channel radio frequency power that is at least -62 dBm or lower. Upon detection of energy in the band, unlicensed low power indoor devices must vacate the channel and stay off the channel as long as detected radio frequency power is equal to or greater than the threshold (-62 dBm). The -62 dBm (or lower) threshold is referenced to a 0 dBi antenna gain.

To ensure incumbent operations are reliably detected in the band, low power indoor devices must detect RF energy throughout their intended operating channel. For example, an 802.11 device that plans to transmit a 40 MHz- wide signal (on a primary 20 MHz channel and a secondary 20 MHz channel) must detect energy throughout the entire 40 MHz channel. Additionally, indoor low-power devices must detect co-channel energy with 90% or greater certainty.

COMMENTS

CSI Telecommunications, Inc. (“CSI”)¹ submits these comments regarding the above-mentioned draft publication.

Expected Interference Environment

Based upon the current revision² to the FCC rules, unlicensed and licensed transceivers will be operating in the same 6 GHz bands. First, let’s review the characteristics of Fixed Service (FS) point to point licensed microwave systems.

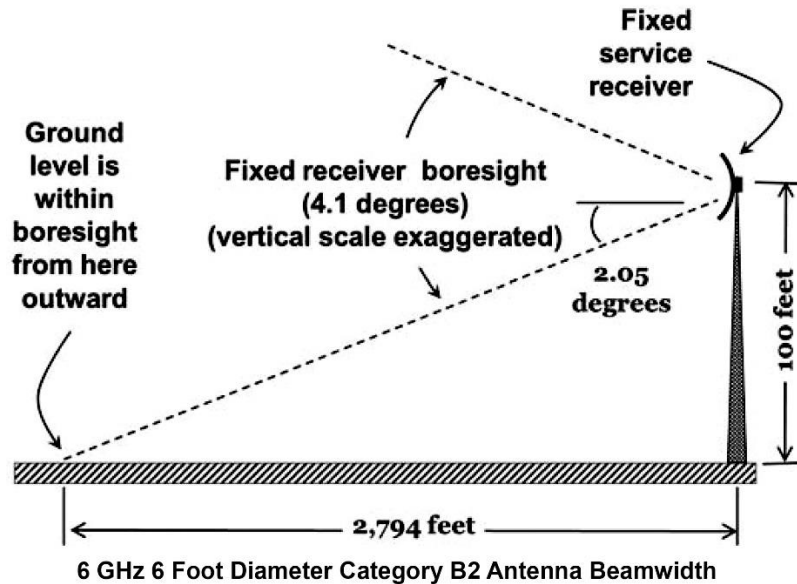
Urban FS microwave links typically traverse 20 to 30 miles between transceiver antennas. The antennas can appear in any location consistent with local zoning.



¹ CSI Telecommunications, Inc. is a consulting engineering firm specializing in innovative telecommunications and electrical engineering solutions since 1986. Our clients include city, county, and state government entities as well as wireless telecommunications carriers, telecommunications common carriers, industrial communications users, private broadcasting companies, educational institutions, cable television systems, and airports.

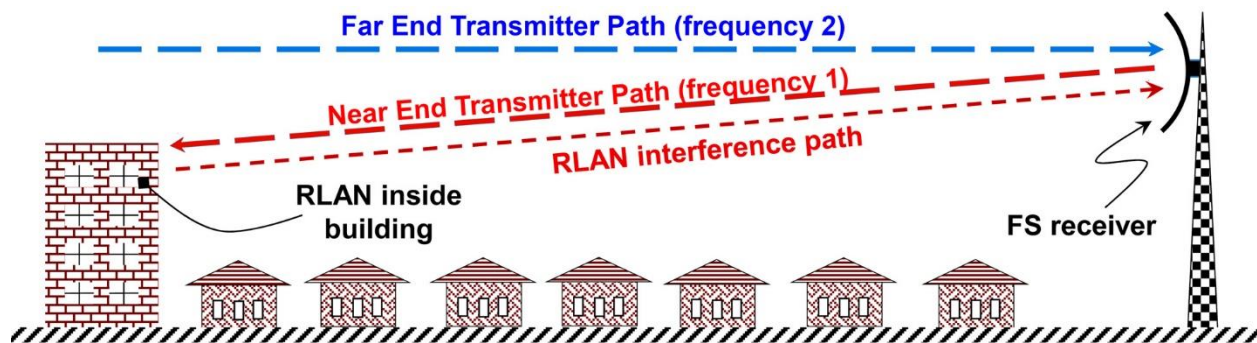
² REPORT AND ORDER AND FURTHER NOTICE OF PROPOSED RULEMAKING, Unlicensed Use of the 6 GHz Band (ET Docket No. 18-295) and Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz (GN Docket No. 17-183), Adopted April 23, 2020 and released April 24, 2020, FCC 20-51

The beamwidth of the antennas is broad enough that for typical locations the transmission and reception area covers most frontal areas of nearby buildings.



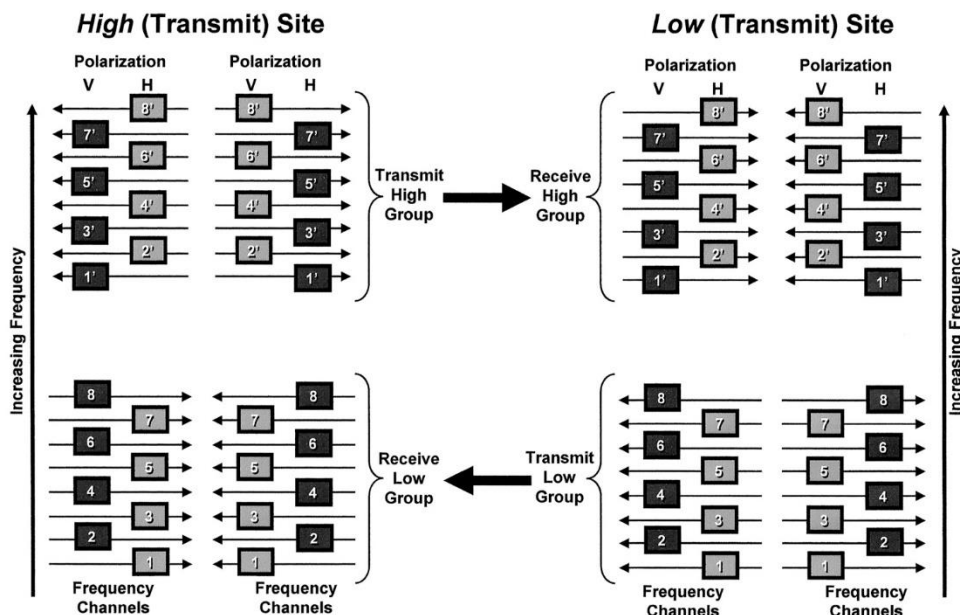
Interaction between Licensed and Unlicensed Transceivers

Internal studies by Nokia Bell Labs suggest that most interference from indoor unlicensed transceivers (“RLANs”), if it occurs, will occur within a mile of the FS receive antenna.



The RLAN transceiver will be operating half duplex using Time Division Duplex (TDD). It will use the same channel for both transmission and reception. The FS transceiver will be operating full duplex using Frequency Division Duplex (FDD). It will be using two separate

channels for transmission and reception.



The RLAN receiver could hear transmission for the nearby FS transmitter. However, that is not the channel that needs to be protected. The receiver is operating on another channel and that is the frequency that needs to be protected. Channels of FS operation are listed in the FCC rules³. The safest method of protection would be to avoid operation in the half of the band NOT sensed by the RLAN. If this is not practical, at least the paired channel to the channel frequency sensed should be avoided.

Expected Interference Power

Next, we shall investigate the expected range of FS transmit power at the RLAN 0 dBi antenna. We shall consider typical parameter ranges as well as a 6 GHz 6 foot parabolic antenna, the most common FS antenna.

³ Code of Federal Regulations (CFRs), Title 47 (Telecommunication), Chapter 1 (Federal Communication Commission), Subchapter D (Safety and Special Radio Services), Part 101 (Fixed Microwave Services), §101.147 (Frequency Assignments): (i) 5,925 to 6,425 MHz, (j) 6,425 to 6,525 MHz, (k) 6,525 to 6,875 MHz and (l) 6875 to 7125 MHz

Transmitter Power (dBm): 15 to 30

Antenna Gain (dBi): 39

Free Space loss (dB, one mile): 112

Building Entry Loss (dB): 0 to 20

FS transmitted Signal Power at the RLAN antenna (dBm): -43 to -78

It appears the expected range of interference from a FS transmitter into a RLAN device is as low as -78 dBm. It is recommended that this be the lowest power level sensing requirement for RLAN contention circuitry.

CONCLUSION

We recommend the Contention Protocol power sensing range to extend to as low as -78 dBm. If foreign interference is sensed, in addition to avoiding that channel's use to protect other RLAN operation, the frequency range of possible FS receive frequencies be avoided to protect FS operation.

Respectfully submitted,

/s/ George Kizer

George Kizer

Staff Consultant

CSI Telecommunications, Inc.

6 Hamilton Landing, Suite 170

Novato, CA 94949

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